

Remarks

The amendments to the claims are intended to clarify that it is the "copolymer" of ethylene-methacrylic acid that contains the respective stated range (wt%) of methacrylic acid and that this "wt%" is based on total weight of the copolymer and that "the copolymer" has the stated melt flow. Similarly, the stated weight percent of the copolymer in the dispersion is amended to recognize that the "wt%" is based on the total weight of the dispersion. All as essentially taught and understood from the disclosure and examples in the original specification. The amendment relative to the claimed stable, uniform aqueous dispersion being "alkali metal free" is intended to more specifically distinguish the claimed subject matter from the cited references of record and the logic and technical rationale presented in the Office Action. Basis for this amendment can be found in the specification and examples as originally filed consistent with the use of the phrase "consisting essentially of" in the claim language.

At present, Claims 1 through 12 are rejected under 35 U.S.C. 103(a) as being unpatentable UK Patent Application issued to Best (GB 2 269 822 A) in view of a patent issued to Nothnagel (U.S. 5,319,019). Reconsideration of this final rejection is requested.

In asserting the above rejection the Office Action starts with the assertion that Best discloses the instantly claimed dispersion except Best does not disclose the instantly claimed excess of ammonia nor the instantly claimed melt flow rate and then identifies the entire document in support of this assertion. The Examiner's attention is directed specifically to the Example at page 5 (second line of the first paragraph) and the comparative example again on page 5 (again the second line of the first paragraph, thereof) wherein the ethylene acrylic acid copolymer employed by Best in both has factually a melt index of "100 grams/10 min." within the numerical range of instant claim language. As such, Applicant views the numerical melt flow rate essentially corresponding to a relatively low to a modest molecular weight copolymer as being an essential item in both the prior art disclosure and the

instant invention, consistent with the thought that stable dispersions of ethylene copolymers will be a function of molecular weight and hence, more likely at high MI (i.e., low viscosity and low molecular weight). In other words, Applicant's attorney agrees with the Examiner's starting assertion that Best does not disclose the instantly claimed excess of ammonia and that this difference is critical for a 35 U.S.C. 103(a) analysis but views the melt index as a similarity and not a difference.

In addition to the above, it is felt that there are other differences between the subject matter sought to be patented and the teaching found in the Best reference that are equally significant in a §103 analysis. For example, Best is clearly describing and claiming a method of producing an aqueous dispersion that involves chemically comminuting which is taught and specifically illustrated in the only example as a low temperature (70°C) high shear disintegration step. Best specifically compares this process to a high temperature (150-155°C) and high pressure (8 bar) stirred autoclave process followed by a low temperature quenching step (see comparative example). And perhaps most significantly, Best uses only ethylene acrylic acid copolymer exclusively in the examples and makes no distinction between dispersion of either example but rather describes them as comparing favorable (presumably meaning his patented process makes the same dispersion). In contrast to the Best disclosure the instant claim language involves ethylene-methacrylic acid copolymer containing 15-35 wt% methacrylic acid based on total weight of copolymer. In combination with this difference the ammonia employed for neutralization is 110 to 150 % of the carboxyl groups of this claimed ethylene-methacrylic acid copolymer. None of this is taught in the Best reference and as such the prior art reference differs from the instant invention.

Furthermore, the amended claim language identifies the claimed dispersions of the instant invention as "stable, uniform, and alkali metal free". Stable is described at page 4, lines 18-20, as no significant change in particle size or the viscosity over times of a year or more. Uniformity also embraces the absence of non-dispersed substances (see page 7). And, the alkali metal free is essentially ignored in Best in that sodium hydroxide is equivalent to

ammonium hydroxide (see wording of claim 1) and according to the teaching in the instant application is critical to establish water resistance coating from the claimed dispersions. More specifically, page 1, lines 30-41, in the Background of the specification, it is made clear that the invention is an aqueous dispersion of ethylene methacrylic acid (not acrylic acid) made using ammonia alone (not in combination with alkali metal).

In support of this description of the instant invention, the examples use a stirred autoclave at elevated temperature more analogous to the comparative example in Best. Most significantly, the comparative examples in the present application establish factually that "stable, uniform, and alkali metal free" aqueous dispersions of ethylene-methacrylic acid copolymer at 100% neutralization and less using ammonium hydroxide do not exist. In other words, Applicant herein has discovered and factually established in the Comparative Examples 1-5 that no long term thermodynamically stable dispersion exists at Applicant's claimed compositional range using exclusively 100% neutralization with ammonia. In contrast, Applicant has also discovered that at 130% neutralization with ammonia the ethylene-methacrylic acid copolymer dispersion does exist and has a shelf life in terms of a year or more.

It is Applicant's position that the primary reference by Best does not teach or even remotely suggest either that stable ethylene-methacrylic acid copolymer dispersions using 100% ammonia alone do not exist or that they do exist at 130% ammonia neutralization. As such, it is felt that the primary reference by Best does not constitute a *prima facie* showing of obviousness by itself.

In this regard, the Examiner at page 3 of the Office Action has chosen to combine the teachings of the secondary Nothnagel reference to establish use of an excess of ammonia and has indicated that the fact that Nothnagel does not disclose ethylene-methacrylic acid copolymer dispersion is not seen as material. With respect to the latter assertion the examiner's attention is directed to 35 U.S.C. 100(a) wherein statutory "invention" is defined as "discovery". As an issue of law "ethylene-methacrylic acid copolymer dispersion" is material.

Also on page 3 of the Office Action the Examiner has rationalized the combination of the secondary reference by asserting:

"The ordinary skilled artisan understands the relationship of HLB (hydrophilic/lipophile balance) to giving a dispersible polymer. This relationship holds regardless of the identity of the specific comonomers. It is noted that many of the monomers of Nothnagel are more hydrophobic than ethylene since they have such large quantities of hydrocarbon."

First and foremost, the discovery described above associated with the instant invention is clearly not based on HLB. Note, the difference between the comparative examples and the working examples is merely an additional 30% excess stoichiometric amount of ammonia and not a change in the hydrophilic/lipophile character of the respective comonomers or resulting copolymer. Also, the Examiner's second quoted statement concerning HLB holding regardless of the identity of the comonomer is questionable. For example, does the Examiner consider tetrafluoroethylene as hydrophilic or lipophilic comonomer (or perhaps neither?) and do aqueous PTFE copolymer dispersions exist? And finally with respect to the third sentence, it appears¹ that the Examiner is equating an increase in the number of carbons of the hydrocarbon as the basis for determining hydrophobic character, which may be true within a given series of homologs but ethylene and acrylic acid esters are not homologs. Because of the presence of the ester group the polyethylene will always be more hydrophobic than the polyacrylate.

As previously argued, Nothnagel at column 7, line 45, and following defines "Acrylic polymer" structurally as pure polyacrylate acid copolymer with no ethylene comonomer. As such, the Nothnagel does not and can not supply the necessary teaching and disclosure not present in the Best reference necessary to make a *prima facie* showing of obviousness under §103. However, even if one were to consider this combination as a *prima facie* showing, the discovery of the heretofore unknown thermodynamically stable dispersion state that exists only at elevated ammonia loading is an unexpected result sufficient to overcome even a *prima facie* showing. As

such, it is felt that there is a basis for the withdrawal of the §103 rejection and such action is requested.

In view of the above brief remarks and amendments to the claims, it is felt that all claims are now in condition for allowance and such action is requested. Should the Examiner believe that an interview or other action in Applicant's behalf would expedite prosecution of the application, the Examiner is urged to contact Applicant's attorney by telephone at (302) 992-6824.

Respectfully submitted,



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